Annual Report
For the 2015 Operating Year

Lakeshore Drinking Water System
2015 Operation and Maintenance
Annual Report

PREPARED BY

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1.0 INTRODUCTION AND BACKGROUND

The purpose of the 2015 Annual Report is to document the operation and maintenance data for the Lakeshore Drinking Water System for review by the Ministry of the Environment in accordance with O. Reg. 170/03. This report covers January 1, 2015 to December 31, 2015. A copy of this report will be submitted to the owner to be displayed to the residents.

2.0 DESCRIPTION OF WATER SYSTEM

The Lakeshore Drinking Water System (DWS # **220000425**) is comprised of four different well systems: Point Clark, Blairs Grove, Huronville, and Murdock Glen. All of these sites are located within the Municipality of Huron-Kinloss along Lake Huron. The system serves an originally estimated population of approximately 3200 people and 2300 connections. Blairs Grove, Huronville, and Murdock Glen each have one well and one well pump. Point Clark has two well and two well pumps. All sites are equipped with an on-line chlorine analyzer and are monitored through a SCADA system based out of the Ripley Municipal office. As a redundancy, each site is also equipped with an auto-dialer that is independent of the SCADA system, to call out alarms in the event of communications/SCADA failure.

The system is characterized as a "secure groundwater system" and categorized as a Class 3 Distribution and Supply Large Municipal Residential drinking water system as per O.Reg 170/03. The system consists of four sub-systems and its equipment has a daily maximum capacity to deliver 11,636 cubic metres of potable water to the Huron-Kinloss Lakeshore community, extending from Point Clark in the south, to Huronville in the north, and the subsystem supplying the Courtney/Amberley Beach subdivision in the Township of Ashfield-Colborne-Wawanosh. The Lakeshore Distribution System currently (March 2015) has 2091 water connections along the Huron-Kinloss Lakeshore and 139 water connections in the Courtney/Amberley Beach Subdivision. In total, the Lakeshore Distribution System could supply a total seasonal population of approximately 4837 (based on 2.71 people per connection average). The Lakeshore area has a large seasonal population and therefore, the demands are significantly higher during the cottage season.

The four subsystems are described as follows:

Blairs Grove: Well #2 (BG-W2) is a 200 mm diameter, 73.2 m deep flowing/artesian bedrock well, equipped with a submersible pump with well pump discharge piping into the chlorine contact reservoir (7.0 x 5.6 x 2.0 m = 82.3 m^3). BG-W2 is located at 28 Cathcart Street. Blairs Grove Monitoring Well #3 (BG-W3) is an overflowing artesian bedrock well, currently not equipped with a well pump, and is covered by a metal-clad, removable, locked, insulated wooden housing unit. The Blairs Grove high-lift pump (BG-HLP1) high-lift discharge manifold has a continuous residual chlorine analyzer. Blairs Grove Well #2 was drilled in 1982, with new well pump and piping installed in 2006.

Huronville South: Well #2 (HS-W2) is a 200 mm diameter, 93.3 m deep bedrock well, that is equipped with a submersible pump, with a well pump discharge piping discharging into the chlorine contact reservoir (65 m^3). HS-W2 is located within a municipal park at 39 Penetangore Row South. Huronville South Well #2 was drilled in 1994, with new well pump and piping installed in 2006 with a soft-start module.

Murdoch Glen: Well #2 (MG-W2) is a 200 mm diameter, 80.5 m deep bedrock well equipped with a submersible pump with well pump discharge piping going to the contact water main (19498 L), and into the single cell concrete ground level storage reservoir (10 x 10 x 4.7 m = 400 m^3). MG-W2 is located at 815 Parkplace. The water level in the reservoir is monitored by an ultrasonic level transducer. The reservoir is configured so that when the level drops to the well pump start level, the SCADA system triggers the well pump to maintain an adequate quantity of treated water in the reservoir. Murdoch Glen Well # 2 was drilled in 1992, with new well pump and piping installed in 2006.

Point Clark Development: Well #1 (PCD-W1) was abandoned in September 2014. Point Clark Development Wells #2 (PCD-W2) and #3 (PCD-W3) are located at 603 Tuscarora Rd. PCD-W2 is a 200 mm diameter, 75.6 m deep bedrock well, equipped with a submersible pump. PCD-W3 is a 250 mm diameter, 82.3 m deep bedrock well, equipped with a submersible pump. Both wells have a common well discharge manifold and a flow meter discharging to the chlorine contact reservoir (65 m^3). Point Clark Well #2 was drilled in 1994, with new well pump and piping installed in 2006. Point Clark Well #3 was drilled in 2015 to replace Point Clark Well #1.

All the Lakeshore wells are secure deep bedrock wells, not under the influence of surface water. The wells penetrate limestone aquifers. Due to the depth and structure of the aquifers, the water temperature is relatively constant (<10°), turbidity is low, and the water is relatively hard. The raw water is also relatively high in sodium, fluoride, and iron, but the lead content of the raw water is well below the half-MAC (Maximum Allowable Concentration). Those who are supplied water from the Lakeshore Drinking Water System are made aware of the various concentrations in their drinking water by numerous means of communication with the Township of Huron-Kinloss.

The Lakeshore Drinking Water System is equipped with a Supervisory Control and Data Acquisition system (SCADA) allowing for remote control, monitoring and record keeping of the system. This provides the operator with the current operating status of the supply and treatment equipment throughout the system at any given time via remote access by computer or iPhone.

A 130 kW diesel generator, located at the Murdoch Glen pumphouse, includes an 1135 L capacity fuel storage tank and is used for emergency power supply. A standpipe is situated in the Point Clark area at 3405 Concession 2, and is constructed of bolted steel. The 102 ft high and 31 ft wide standpipe has an effective storage of approximately 1500 m^3 to supply the entire Lakeshore System in emergency situations.

Each pumphouse in the Lakeshore Drinking Water System ensures that raw water is disinfected and undergoes iron sequestering. Sodium hypochlorite (12%), the chemical used in the disinfection process, disinfects the raw water, and serves primarily as a measure to prevent microbiological growth within the raw water pipeline, reservoir, and distribution system. The Lakeshore Drinking Water System has two different methods to achieve a minimum of 2-log removal or inactivation of viruses as outlined in the MOECC *Procedure for Disinfection of Drinking Water in Ontario*. Three pumphouses have a chlorine contact chamber (baffled basement reservoir), while the Murdoch Glen pumphouse has a chlorine contact watermain.

Each pumphouse also provides iron sequesting by means of treating the chlorinated water with sodium silicate. Sequestering does not remove iron, but instead it prevents the dissolved iron from precipitating which can stain plumbing fixtures and appear as discoloration in the water. It can leave a slight metallic taste in the water.

The Township of Huron-Kinloss has an agreement with the Municipality of Kincardine, where Kincardine is the Operating Authority for a small area of Huron-Kinloss known as the Huronville Subdivision Distribution System (Plan M28). This subdivision receives all their water from the Municipality of Kincardine Water System. The Township of Huron-Kinloss installed an interconnecting valve between the Lakeshore Well Supply to the Huronville Subdivision Distribution System and/or the Town of Kincardine. This valve is to be used for emergency purposes only.

3.0 SUMMARY OF WATER QUALITY MONITORING

3.1 Water Treatment Equipment Operation and Monitoring

3.1.1 Treated Water (Point of Entry) Chlorine Residual

In 2015, a total of 1447 samples were collected and analyzed for Free Chlorine Residual at the Point of Entry (POE) for treated water using a HACH pocket chlorine colorimeter. Four samples were missed on January 7, 2015, and four samples were missed on January 9, 2015 due to closed roads from weather conditions.

Table 1 shows the monthly average of free chlorine residual values.

3.1.2 Distribution Chlorine Residual

In 2015, a Total of 363 samples were collected in the Lakeshore Distribution System. Two samples were missed due to closed roads from weather conditions (Jan. 7/15, and Jan. 9/15).

Table 1 – Treated and Distribution Chlorine Residuals for Lakeshore Drinking Water System [a]

Date	*Site*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	***Avg***	***Min***	***Max***	***# Samples***
Average Treated Chlorine Residual (mg/L)	BG	1.13	1.29	1.24	1.60	1.37	1.17	1.43	1.29	1.16	1.35	1.38	1.11	**1.29**	**0.13**	**2.00**	**363**
	HS	1.38	1.36	1.39	1.37	1.36	1.32	1.39	1.43	1.48	1.48	1.49	1.55	**1.42**	**0.35**	**3.52**	**363**
	MG	1.17	1.39	1.43	1.38	1.37	1.37	1.60	1.34	1.48	1.38	1.39	1.41	**1.39**	**0.38**	**2.00**	**363**
	PC	1.30	1.32	1.34	1.39	1.30	1.31	1.27	1.41	1.42	1.44	1.51	1.40	**1.37**	**0.65**	**4.99**	**363**
Average Distribution Chlorine Residual (mg/L)	N/A	1.06	1.08	1.03	1.10	1.07	1.01	1.02	1.13	0.92	1.04	1.1	1.1	**1.06**	**0.05**	**1.61**	**363**

[a] – Results collected from January 1, 2015 – December 31, 2015

3.1.3 Turbidity

Drinking water turbidity was measured by a portable turbidity analyzer. The raw and treated water grab samples were collected monthly and analyzed for turbidity.

Table 2 provides a summary of raw and treated turbidity results. The maximum turbidity measured in the raw water was 2.74 NTU and the maximum turbidity measured in the treated water was 1.70 NTU.

Table 2 – Raw and Treated Water Turbidities for Lakeshore Drinking Water System [a]

Date	*Site*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Avg*	*Min*	*Max*	*# Samples*
Average Raw Turbidity (NTU)	BG	0.62	0.40	0.86	0.27	0.58	0.74	0.46	0.53	0.74	0.95	0.93	1.06	0.73	0.27	1.45	18
	HS	0.11	0.22	0.24	0.12	0.06	0.23	0.14	0.17	0.14	0.13	0.16	0.10	0.16	0.05	0.28	22
	MG	0.23	0.27	0.33	0.35	0.23	0.24	0.16	0.26	0.21	0.25	0.56	0.16	0.25	0.12	0.56	25
	PC2	0.21	0.19	0.20	1.18	0.48	0.33	0.16	0.31	0.20	0.29	0.62	0.18	0.43	0.13	2.74	35
	PC3	--	--	--	--	--	--	--	0.44	0.43	0.17	0.51	0.24	0.32	0.17	0.51	9
Average Treated Turbidity (NTU)	BG	1.23	--	0.69	0.69	1.12	1.02	0.69	0.47	0.59	0.89	0.94	0.41	0.79	0.22	1.70	19
	HS	0.16	0.34	0.22	0.16	0.16	0.22	0.13	0.08	0.13	0.20	0.15	0.11	0.17	0.06	0.39	25
	MG	0.30	0.30	0.32	0.24	0.23	0.31	0.15	0.16	0.17	0.19	0.24	0.25	0.24	0.13	0.43	27
	PC	0.23	0.21	0.19	0.87	0.24	0.16	0.15	0.35	0.30	0.22	0.18	0.19	0.31	0.09	1.65	29

[a] – Results collected from January 1, 2015 – December 31, 2015

3.2 Microbiological Sampling as per Schedule 10, O. Reg. 170/03

3.2.1 Raw Water Samples

Raw water samples are taken every week. In 2015, a total of 206 samples were collected and analyzed for E.Coli and Total Coliform. The E.Coli results obtained were 0 cfu/100 mL. The range of Total Coliform results were 0 – 4 cfu/100 mL.

Table 3 provides a summary of bacteriological results performed on the raw water.

Table 3 – Microbiological Results for Raw Water at Lakeshore Drinking Water System [a]

	E.Coli			*Total Coliform*		
Date	# Samples	# Samples 0	# Samples ≥1	# Samples	# Samples 0	# Samples 1 - 4
Jan	16	16	0	16	16	0
Feb	15	15	0	15	15	0
Mar	19	19	0	19	19	0
Apr	16	16	0	16	16	0
May	16	16	0	16	16	0
Jun	20	20	0	20	19	1 [b]
Jul	16	16	0	16	16	0
Aug	16	16	0	16	15	1 [b]
Sept	20	20	0	20	20	0
Oct	16	16	0	16	16	0
Nov	16	16	0	16	16	0
Dec	20	20	0	20	20	0
Total	206	206	0	206	204	2

[a] – Results collected from January 1, 2015 – December 31, 2015
[b] -- June 16, 2015 – 1 Total Coliform from Point Clark Well # 2
August 18, 2015 – 4 Total Coliform from Huronville South Well # 2

3.2.2 Treated Water (Point of Entry) Samples

One (1) treated water sample from each point of entry is taken every week and analyzed for E.Coli, Total Coliform, and for Heterotrophic Plate Count (HPC). A total of 207 treated water samples were collected and analyzed for the above parameters. All samples were found to be safe. Each E.Coli and Total Coliform result from the treated water was 0 cfu/100 mL. The range of HPC results were 0 – 10 cfu/100 mL.

Table 4 provides a summary of all bacteriological results performed on treated water.

Table 4 – Microbiological Results for Treated Water (Point of Entry) at Lakeshore Drinking Water System [a]

Date	*E.Coli*			*Total Coliform*			*HPC*		
	# Samples	# Samples 0	# Samples ≥1	# Samples	# Samples 0	# Samples ≥1	# Samples	# Samples 0	# Samples 1-10
Jan	16	16	0	16	16	0	16	8	8
Feb	16	16	0	16	16	0	16	11	5
Mar	20	20	0	20	20	0	20	16	4
Apr	15	15	0	15	15	0	15	9	6
May	16	16	0	16	16	0	16	5	11
Jun	20	20	0	20	20	0	20	10	10
Jul	16	16	0	16	16	0	16	13	3
Aug	16	16	0	16	16	0	16	14	2
Sep	20	20	0	20	20	0	20	10	10
Oct	16	16	0	16	16	0	16	11	5
Nov	16	16	0	16	16	0	16	10	6
Dec	20	20	0	20	20	0	20	14	6
Total	207	207	0	207	207	0	207	131	76

[a] – Results collected from January 1, 2015 – December 31, 2015

3.2.3 Distribution Samples

Seven (7) distribution samples are collected every week and tested for E.Coli, Total Coliform, and for Heterotrophic Plate Count (HPC). In 2015, a total of 358 distribution samples were collected and analyzed for the above parameters and all sampled were found to be safe. Each E.Coli and Total Coliform result from the treated water was 0 cfu/100 mL. The range of HPC results were 0 – 25 cfu/100 mL. **Table 5.** provides a summary of all bacteriological samples taken in the distribution system.

Table 5 – Microbiological Results for Lakeshore Drinking Water Distribution System [a]

Date	*E.Coli*			*Total Coliform*			*HPC*		
	# Samples	# Samples 0	# Samples ≥1	# Samples	# Samples 0	# Samples ≥1	# Samples	# Samples 0	# Samples 1 - 25
Jan	28	28	0	28	28	0	16	7	9
Feb	28	28	0	28	28	0	16	11	5
Mar	28	28	0	28	28	0	16	13	3
Apr	34	34	0	34	34	0	22	10	12
May	21	21	0	21	21	0	12	5	7
Jun	35	35	0	35	35	0	23	15	8
Jul	30	30	0	30	30	0	16	11	5
Aug	28	28	0	28	28	0	19	15	4
Sep	35	35	0	35	35	0	21	13	8
Oct	28	28	0	28	28	0	16	11	5
Nov	28	28	0	28	28	0	16	9	7
Dec	35	35	0	35	35	0	20	10	10
Total	358	358	0	358	358	0	213	130	83

[a] – Results collected from January 1, 2015 – December 31, 2015

3.3 Chemical Sampling & Testing as per Schedule 13, O. Reg.170/03

3.3.1 Inorganics

Treated water samples are collected every 36 months and tested for inorganics. The most recent samples for the Lakeshore Drinking Water System were collected on June 10, 2015 and submitted to the laboratory for analysis of inorganics as listed in Schedule 23. All parameters were found to be within compliance. Inorganics will be sampled and analyzed again on or before June 10, 2018. Results from the June 10, 2015 samples can be found in **Table 6.**

Table 6 – Schedule 23 Results for Lakeshore Drinking Water System [a]

Parameter	*Blairs Grove Result (µg/L)*	*Huronville South Result (µg/L)*	*Murdock Glen Result (µg/L)*	*Point Clark Result (µg/L)*	*Maximum Allowable Concentration (µg/L)*
Antimony	0.02 <MDL	0.02 <MDL	0.02 <MDL	0.02 <MDL	6
Arsenic	3.9	0.4	1.6	5.5	25
Barium	24.1	24.3	26.6	25.3	1000
Boron	68.2	151	138	71.1	5000
Cadmium	0.003 <MDL	0.003 <MDL	0.012	0.003 <MDL	5
Chromium	0.03 <MDL	0.03 <MDL	0.08	0.03 <MDL	50
Mercury	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	1
Selenium	0.04 <MDL	0.04 <MDL	0.04 <MDL	0.04 <MDL	10
Uranium	0.419	0.305	1.47	0.431	20

[a] – Samples collected on June 10, 2015

3.3.2 Lead

Schedule 15.1 of Ontario Regulation 170/03 requires that samples be taken during two seasons: once between December 15 and April 15 and once between June 15 and October 15. The Lakeshore Drinking Water System is currently under a reduced sampling program for lead where lead, pH and alkalinity are sampled in each season every 3 years. In the interim, pH and alkalinity are tested during each sampling season. In the two previous lead sampling seasons, two pH and alkalinity samples were taken on March 13, 2015 and two pH and alkalinity samples on June 10, 2015. These parameters are required to be sampled and analyzed again between the months of December 2015 and April 2016 and again between June and October 2016. Lead samples are required next in the 2017 sampling season. 2015 results can be found in Table 7.

Table 7 – Lead Sampling Program Results for Lakeshore Drinking Water System [a]

Sampling Season	*pH*	*Alkalinity (mg/L)*
Dec-Apr	7.49	159
	7.30	183
Jun-Oct	7.20	183
	7.34	173

[a] – Samples collected on March 13, 2015 and June 10, 2015 respectively.

3.3.3 Organics

Treated water samples are collected every 36 months and tested for schedule 24 organic parameters. The most recent samples were collected on June 10, 2015. All parameters were found to be within compliance. Organics will be sampled and analyzed again on or before June 10, 2018. June 10, 2015 sample results can be found in **Table 8.**

Table 8 – Schedule 24 Results for Lakeshore Drinking Water System [a]

Parameter	*Blairs Grove Result (µg/L)*	*Huronville South Result (µg/L)*	*Murdock Glen Result (µg/L)*	*Point Clark Result (µg/L)*	*Maximum Allowable Concentration (µg/L)*
Benzene	0.32 <MDL	0.32 <MDL	0.32 <MDL	0.32 <MDL	5
Carbon Tetrachloride	0.16 <MDL	0.16 <MDL	0.16 <MDL	0.16 <MDL	5
1,2-Dichlorobenzene	0.41 <MDL	0.41 <MDL	0.41 <MDL	0.41 <MDL	200
1,4-Dichlorobenzene	0.36 <MDL	0.36 <MDL	0.36 <MDL	0.36 <MDL	5
1,1-Dichloroethylene	0.33 <MDL	0.33 <MDL	0.33 <MDL	0.33 <MDL	14
1,2-Dichloroethane	0.35 <MDL	0.35 <MDL	0.35 <MDL	0.35 <MDL	5
Dichloromethane	0.35 <MDL	0.35 <MDL	0.35 <MDL	0.35 <MDL	50
Monochlorobenzene	0.3 <MDL	0.3 <MDL	0.3 <MDL	0.3 <MDL	80
Tetrachloroethylene	0.35 <MDL	0.35 <MDL	0.35 <MDL	0.35 <MDL	30
Trichloroethylene	0.44 <MDL	0.44 <MDL	0.44 <MDL	0.44 <MDL	50
Vinyl Chloride	0.17 <MDL	0.17 <MDL	0.17 <MDL	0.17 <MDL	2
Diquat	1 <MDL	1 <MDL	1 <MDL	1 <MDL	70
Paraquat	1 <MDL	1 <MDL	1 <MDL	1 <MDL	10
Glyphosate	1 <MDL	1 <MDL	1 <MDL	1 <MDL	280
Polychlorinated Biphenyls	0.04 <MDL	0.04 <MDL	0.04 <MDL	0.04 <MDL	3
Benzo(a)pyrene	0.004 <MDL	0.004 <MDL	0.004 <MDL	0.004 <MDL	0.01
2,4-dichlorophenol	0.15 <MDL	0.15 <MDL	0.15 <MDL	0.15 <MDL	900
2,4,6-trichlorophenol	0.25 <MDL	0.25 <MDL	0.25 <MDL	0.25 <MDL	5
2,3,4,5-tetrachlorophenol	0.20 <MDL	0.20 <MDL	0.20 <MDL	0.20 <MDL	100
Pentachlorophenol	0.15 <MDL	0.15 <MDL	0.15 <MDL	0.15 <MDL	60
Alachlor	0.02 <MDL	0.02 <MDL	0.02 <MDL	0.02 <MDL	5
Aldicarb	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	9
Aldrin+Dieldrin	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.7
Aldrin	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	-
Dieldrin	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	-
Atrazine+N-dealkylated metabolites	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	5
Atrazine	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	-
De-ethylated atrazine	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	-
Azinphos-methyl	0.05 <MDL	0.05 <MDL	0.05 <MDL	0.05 <MDL	20
Bendiocarb	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	40
Carbaryl	0.05 <MDL	0.05 <MDL	0.05 <MDL	0.05 <MDL	90

Parameter	*Blairs Grove Result (µg/L)*	*Huronville South Result (µg/L)*	*Murdock Glen Result (µg/L)*	*Point Clark Result (µg/L)*	*Maximum Allowable Concentration (µg/L)*
Carbofuran	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	90
Chlordane	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	7
a-chlordane	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	-
g-chlordane	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	-
Oxychlordane	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	-
Chlorpyrifos	0.02 <MDL	0.02 <MDL	0.02 <MDL	0.02 <MDL	90
Cyanazine	0.03 <MDL	0.03 <MDL	0.03 <MDL	0.03 <MDL	10
Diazinon	0.02 <MDL	0.02 <MDL	0.02 <MDL	0.02 <MDL	20
(DDT)+Metabolites	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	30
op-DDT	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	-
pp-DDD	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	-
pp-DDE	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	-
pp-DDT	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	-
Dimethoate	0.03 <MDL	0.03 <MDL	0.03 <MDL	0.03 <MDL	20
Diuron	0.03 <MDL	0.03 <MDL	0.03 <MDL	0.03 <MDL	150
Heptachlor-Heptachlor Epoxide	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	3
Heptachlor	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	-
Heptachlor epoxide	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	-
Lindane	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	4
Malathion	0.02 <MDL	0.02 <MDL	0.02 <MDL	0.02 <MDL	190
Methoxychlor	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	900
Metolachlor	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	50
Metribuzin	0.02 <MDL	0.02 <MDL	0.02 <MDL	0.02 <MDL	80
Parathion	0.02 <MDL	0.02 <MDL	0.02 <MDL	0.02 <MDL	50
Phorate	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	2
Prometryne	0.03 <MDL	0.03 <MDL	0.03 <MDL	0.03 <MDL	1
Simazine	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	10
Temephos	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	280
Terbufos	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	1
Triallate	0.01 <MDL	0.01 <MDL	0.01 <MDL	0.01 <MDL	230
Trifluralin	0.02 <MDL	0.02 <MDL	0.02 <MDL	0.02 <MDL	45
2,4-dichlorophenoxyacetic acid	0.19 <MDL	0.19 <MDL	0.19 <MDL	0.19 <MDL	100
2,4,5-trichlorophenoxyacetic acid	0.22 <MDL	0.22 <MDL	0.22 <MDL	0.22 <MDL	280
Bromoxynil	0.33 <MDL	0.33 <MDL	0.33 <MDL	0.33 <MDL	5
Dicamba	0.20 <MDL	0.20 <MDL	0.20 <MDL	0.20 <MDL	120
Diclofop-methyl	0.40 <MDL	0.40 <MDL	0.40 <MDL	0.40 <MDL	9
Dinoseb	0.36 <MDL	0.36 <MDL	0.36 <MDL	0.36 <MDL	10
Picloram	1 <MDL	1 <MDL	1 <MDL	1 <MDL	190

[a] – Samples collected on June 10, 2015.

3.3.4 Trihalomethanes

Distribution samples are taken every three months from representative points in the distribution system and tested for Trihalomethanes (THMs). In 2015, samples were collected during the months of February, May, August, and November. The Ontario Drinking Water Quality Standard (ODWQS) have set a Maximum Allowable Concentration (MAC) of 100 µg/L for this parameter and it is expressed as a running annual average. In 2015, the average THM was found to be 10.60 µg/L, which is within compliance. Refer to **Table 9** for the summary of trihalomethane results. In 2016, samples will be collected in February, May, August, and November.

3.3.5 Nitrate & Nitrite

Four treated water samples are taken every three months and tested for nitrate and nitrite. In 2015, samples were collected during the months of February, May, August, and November. The Ontario Drinking Water Quality Standard (ODWQS) have set a Maximum Allowable Concentration (MAC) of 1 mg/L for nitrites and 10 mg/L for nitrates. The results were found to be within compliance. Refer to **Table 9.** In 2016, samples will be collected in February, May, August, and November.

Table 9 – Nitrate, Nitrite and THM Results at Lakeshore Drinking Water System [a]

BLAIRS GROVE

	Nitrate		***Nitrite***		***THMs***	
Date	# Samples	Result (mg/L)	# Samples	Result (mg/L)	# Samples	Result (µg/L)
Feb	1	<0.006	1	<0.003	1	8.1
May	1	<0.006	1	<0.003	1	8.0
Aug	1	<0.006	1	<0.003	1	14
Nov	1	<0.006	1	<0.003	1	18
Total	4		4		4	
Average		<0.006		<0.003		12.03
Maximum		<0.006		<0.003		18

HURONVILLE SOUTH

	Nitrate		***Nitrite***		***THMs***	
Date	# Samples	Result (mg/L)	# Samples	Result (mg/L)	# Samples	Result (µg/L)
Feb	1	<0.006	1	<0.003	1	10
May	1	<0.006	1	<0.003	1	8.8
Aug	1	<0.006	1	<0.003	1	5.4
Nov	1	<0.006	1	<0.003	1	7.3
Total	4		4		4	
Average		<0.006		<0.003		7.88
Maximum		<0.006		<0.003		10

MURDOCK GLEN

	Nitrate		*Nitrite*		*THMs*	
Date	# Samples	Result (mg/L)	# Samples	Result (mg/L)	# Samples	Result (µg/L)
Feb	1	<0.006	1	<0.003	1	15
May	1	<0.006	1	<0.003	1	11
Aug	1	<0.006	1	<0.003	1	9.9
Nov	1	<0.006	1	<0.003	1	18
Total	4		4		4	
Average		<0.006		<0.003		13.48
Maximum		<0.006		<0.003		18

POINT CLARK

	Nitrate		*Nitrite*		*THMs*	
Date	# Samples	Result (mg/L)	# Samples	Result (mg/L)	# Samples	Result (µg/L)
Feb	1	<0.006	1	<0.003	1	4.7
May	1	<0.006	1	<0.003	1	13
Aug	1	<0.006	1	<0.003	1	11
Nov	1	<0.006	1	<0.003	1	7.5
Total	4		4		4	
Average		<0.006		<0.003		9.05
Maximum		<0.006		<0.003		13

[a] – Results collected from January 1, 2015 – December 31, 2015

3.3.6 Sodium

One water sample is collected from each point of entry every 60 months and tested for Sodium. The Ontario Drinking Water Standards (ODWQS) have set a Maximum Acceptable concentration (MAC) of 200 mg/L for Sodium and requires the Medical Office of Health be notified if the concentration exceeds 20 mg/L. These samples were last collected on June 17, 2011. Refer to Table 10. The next water sample for Sodium will be collected and analyzed on or before June 17, 2016.

3.3.7 Fluoride

One water sample is collected from each point of entry at least once in every 60 months and tested for Fluoride. The Ontario Drinking Water Quality Standards (ODWQS) have set a MAC of 1.5 mg/L. On May 12, 2015, samples were collected for this analysis. All four samples exceeded the Maximum Allowable Concentration (MAC). This is due to naturally occurring fluoride in the aquifers. The next water samples for Fluoride will be collected and analyzed on or before May 12, 2015. Refer to Table 10

Table 10 – Sodium and Fluoride Results at Lakeshore Drinking Water System

	Sodium	Fluoride
Location	Result (mg/L)	Result (mg/L)
Blairs Grove	86.4	1.71
Huronville South	46.6	2.19
Murdock Glen	49.7	2.12
Point Clark	16.0	2.04
MAC	20	1.50

4.0 WATER AND CHEMCIAL USAGE

4.1 Chemical Usage

From January 1, 2015 to December 31, 2015, 1397.26 kg of sodium hypochlorite (NaOCI) was used to treat the water that was provided to the distribution system with an average dosage of 3.19 mg/L. During the same time period, kgs of sodium silicate (Na_2SiO_3) was used for iron sequestering. Refer to **Table 11** for sodium hypochlorite usage and **Table 12** for sodium silicate usage.

Table 11 – Sodium Hypochlorite Usage at Lakeshore Drinking Water System [a]

	BLAIRS GROVE		***HURONVILLE SOUTH***		***MURDOCK GLEN***		***POINT CLARK***	
Date	Usage (kg)	Average Dosage (mg/L)	Usage (kg)	Average Dosage (mg/L)	Usage (kg)	Average Dosage (mg/L)	Usage (kg)	Average Dosage (mg/L)
Jan	2.76	3.62	21.11	2.86	5.38	3.23	41.12	2.43
Feb	3.31	3.88	16.15	2.75	8.42	3.92	38.50	2.46
Mar	16.84	3.05	26.50	2.76	5.93	3.63	44.30	2.46
Apr	48.02	4.48	25.53	2.85	5.38	2.99	13.66	2.57
May	32.29	3.42	53.13	2.66	9.66	3.14	50.23	2.66
Jun	2.35	3.92	51.75	2.83	16.01	3.20	57.96	2.32
Jul	27.74	3.86	89.15	3.09	25.53	3.20	81.83	2.33
Aug	10.21	2.80	75.21	3.08	13.25	3.16	77.56	2.63
Sep	4.14	4.18	69.83	3.25	11.45	3.62	68.86	2.83
Oct	16.56	3.93	37.54	3.26	8.00	3.77	35.88	2.22
Nov	11.45	3.74	24.15	3.18	6.21	3.63	38.09	3.04
Dec	1.10	4.18	24.84	3.13	5.11	4.29	37.26	2.63
Total	**176.78**		**514.88**		**120.34**		**585.26**	
Average		**3.76**		**2.98**		**3.48**		**2.55**

[a] – Results collected from January 1, 2015 – December 31, 2015

Table 12 - Sodium Silicate Usage at Lakeshore Drinking Water System [a]

	BLAIRS GROVE		***HURONVILLE SOUTH***		***MURDOCK GLEN***		***POINT CLARK***	
Date	Usage (kg)	Average Dosage (mg/L)	Usage (kg)	Average Dosage (mg/L)	Usage (kg)	Average Dosage (mg/L)	Usage (kg)	Average Dosage (mg/L)
Jan	12.55	16.46	29.27	3.96	26.49	15.92	262.07	15.49
Feb	16.73	19.59	26.49	4.51	32.06	14.93	216.07	13.78
Mar	105.94	19.22	43.21	4.50	27.88	17.07	245.34	13.64
Apr	372.20	32.22	40.43	4.52	26.49	14.70	73.88	13.89
May	289.95	30.73	125.46	6.28	50.18	16.29	284.38	15.04
Jun	19.52	32.64	124.07	6.78	79.46	15.90	356.86	14.28
Jul	172.86	24.07	216.07	7.48	132.43	16.58	434.93	12.38
Aug	85.03	23.34	199.34	8.15	69.70	16.61	397.29	13.47
Sep	33.46	33.79	163.10	7.60	55.76	17.61	347.11	14.27
Oct	150.55	35.69	75.28	6.53	37.64	17.74	170.07	10.54
Nov	93.40	30.49	82.25	10.82	30.67	17.92	175.64	14.03
Dec	8.36	31.68	41.82	5.27	23.70	19.90	196.55	13.87
Total	**1360.54**		**1166.78**		**592.45**		**3160.20**	
Average		**27.49**		**6.37**		**16.76**		**13.65**

4.2 Annual Volumes

A summary of the water supplied to the distribution system in 2015 is provided in **Table 13.** This Table provides a breakdown of the monthly volumes provided to the distribution system.

Flow meters were calibrated on July 29, 2015 by Coulter Water Meter Service and were found to be acceptable. The water meters will be calibrated again by July 2016.

Table 13 – Treated Water Volume for Lakeshore Drinking Water System [a]

BLAIRS GROVE

Date	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	***Avg***	***Max***	***Total***
Avg Daily Volume (m^3)	21.51	27.13	174.30	327.76	272.26	18.47	227.09	86.84	26.89	121.19	91.66	7.80	**116.91**		
Max Daily Volume (m^3)	343.02	324.29	842.89	818.38	1227.55	212.99	702.52	752.66	380.56	435.18	456.84	27.10		**1,227.55**	
Total Monthly Volume (m^3)	666.66	759.69	5403.16	12437.11	8440.03	553.97	7039.68	2692.17	806.70	3756.78	2749.88	241.89			**45,547.72**

[a] – Results collected from January 1, 2015 – December 31, 2015

HURONVILLE SOUTH

Date	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	***Avg***	***Max***	***Total***
Avg Daily Volume (m^3)	234.81	205.07	300.07	293.91	647.77	605.31	943.36	738.38	708.13	367.91	242.35	251.39	**461.54**		
Max Daily Volume (m^3)	281.69	316.11	361.18	496.56	1107.77	1104.47	1559.12	1400.21	1201.51	590.44	281.77	281.78		**1559.12**	
Total Monthly Volume (m^3)	7,279.01	5,741.82	9,302.10	8,817.40	20,081.00	18,159.27	29,244.01	22,889.65	21,244.05	11,405.09	7,270.53	7,793.06			**169,226.99**

[a] – Results collected from January 1, 2015 – December 31, 2015

MURDOCK GLEN

Date	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	***Avg***	***Max***	***Total***
Avg Daily Volume (m^3)	56.62	78.76	57.88	56.22	96.08	160.39	255.92	125.83	106.02	71.59	57.97	40.94	**92.19**		
Max Daily Volume (m^3)	263.46	316.14	127.56	197.46	257.12	814.03	1,208.95	386.86	406.97	194.87	150.71	69.62		**1,208.95**	
Total Monthly Volume (m^3)	1,755.19	2,205.20	1,794.31	1,686.51	2,978.51	4,811.57	7,933.46	3,900.64	3,180.58	2,219.21	1,739.00	1,228.31			**35,551.97**

[a] – Results collected from January 1, 2015 – December 31, 2015

POINT CLARK

Date	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	***Avg***	***Max***	***Total***
Average Daily Volume (m^3)	528.62	540.25	529.30	178.27	593.92	801.98	1,088.98	911.66	781.04	504.44	401.91	445.94	**608.86**		
Maximum Daily Volume (m^3)	810.08	801.34	879.62	623.76	1,098.01	1,049.53	1,272.08	1,482.71	1,430.85	855.97	645.98	578.80		**1482.71**	
Total Monthly Volume (m^3)	16,387.26	15,126.91	16,408.37	5348.15	18,411.39	24,059.39	33,758.25	28,261.61	23,431.24	15,637.59	11,655.40	13,824.24			**222,554.22**

[a] – Results collected from January 1, 2015 – December 31, 2015

TOTAL VOLUME FOR LAKESHORE: 472,880.90 m^3

5.0 IMPROVEMENTS TO SYSTEM AND ROUTINE AND PREVENTATIVE MAINTENANCE

The following summarizes water system improvements and routine and preventative maintenance for the Lakeshore Drinking Water System Supply:

Point Clark:
Routine and preventative maintenance performed as per Jobs Plus schedule.
March 24 – April 7, 2015 – Lang Well Drillers on-site at Point Clark for drilling of Well # 3 (pumphouse off-line during this event).
May 5 – 8, 2015 – flow testing of Well # 3.
Aug. 5, 2015 – Well# 3 was put into service after bacteriological samples were clear.
Nov. 7, 2015 - Telecommunication modems were replaced at Point Clark and the Standpipe.

Blairs Grove:
Routine and preventative maintenance performed as per Jobs Plus schedule.
March 16, 2015 – Replaced UPS for communications devices and autodialer.
March 30, 2015 – Replaced UPS for chlorine analyzer.
Nov. 6 – 8, 2015 – The batteries for the RTU were replaced.

Murdock Glen:
Routine and preventative maintenance performed as per Jobs Plus schedule.
April 7, 2015 – Replaced contactor for HLP3.
November 30, 2015 – Replaced float in pipe gallery for sump pump.

Huronville South:
Routine and preventative maintenance performed as per Jobs Plus schedule.
March 26, 2015 – HuronTel raised radio receiver to improve communications.
April 16, 2015 – Replaced UPS for chlorine analyzer.
July 15, 2015 – Replaced dehumidifier.
September 9, 2015 – Eramosa made programming changes to allow reset of HLPs when power problems exist.
November 11, 2015 – New starter and contactor installed for HLP 2.
December 10, 2015 – HLP 2 was rebuilt and reinstalled.

6.0 MINISTRY OF THE ENVIRONMENT INSPECTIONS AND REGULATORY ISSUES

The Ministry of the Environment and Climate Change conducted an inspection on Lakeshore Drinking Water System Supply between Oct. 8 – Dec. 17, 2015.
DWQMS Audit was conducted on June 25, 2015.
Flow meter calibrations were conducted on July 28, 2015.

Blairs Grove:
One adverse water quality event occurred during 2015. AWQI # 127034. On Oct. 25, 2015, a failure of the chlorine injector caused a low chlorine residual of 0.13 mg/L. The low-chlorine water was flushed from the system. Bacteriological samples were taken on Oct. 27, 2015 and the results indicated no presence of E.Coli or Total Coliform.